APPENDIX 3.8.X

GUIDELINES FOR SURVEILLANCE AND MONITORING FOR BLUETONGUE VIRUS

1. Purpose of the document

This document describes guidelines for surveillance and monitoring to establish the bluetongue virus (BTV) status of a country or zone, in the absence of clinical signs of bluetongue.

2. Introduction

The global BTV distribution historically has been shown to be between latitudes of approximately 40°N and 35°S.

Within these latitudes, the BTV status of a country or zone, in the absence of clinical signs of bluetongue, must be substantiated. Demonstration of BTV status requires an adequate knowledge of the epidemiology of BTV in the country or zone being assessed. Such knowledge should include consideration of the natural history of BTVs and their vectors, climate, geography, livestock demographics, vaccination history, animal husbandry practices and relevant historical information.

The composition and mix of a surveillance and monitoring system for any country or zone will be influenced by its location. Within a country or zone where clinical disease is not present, the emphasis will be on surveillance; in infected countries or zones, the emphasis will tend to be on monitoring. Results from surveillance within the supposedly free country or zone will assist in supporting a case for freedom. Results from monitoring in infected countries or zones can further clarify the epidemiology of BTV infection and vector distribution in that country or zone.

3. Components of a surveillance and monitoring system for bluetongue

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a) Clinical surveillance

Clinical bluetongue disease must be notifiable and a system must be in place for reporting suspect clinical bluetongue disease. Suspicion of disease within a free country or zone should be followed by appropriate official control measures. Access to suitable laboratories to screen for and confirm a clinical diagnosis of bluetongue is essential.

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b) Serological surveillance and monitoring

An active programme of surveillance and monitoring of host populations to detect evidence of BTV transmission is essential to establish BTV status in a country or zone, in the absence of clinical signs. Serological testing of ruminants has shown to be one of the most effective methods of detecting the presence of BTV. The species tested depends on the epidemiology of BTV, and the species available, in the local area. Cattle are usually the most sensitive, appropriate and available indicator species.

Surveillance and monitoring may include serological surveys, for example abattoir surveys, the use of sentinel animals, or a combination of methods.

Interpretation of serological data should take into account the sensitivity and specificity of any tests used.

Serological surveillance in a free zone should target those areas that are at highest risk of BTV transmission, based on the results of previous surveillance and other information. This will usually be toward the boundary of the free zone. In view of the epidemiology of BTV, either random or purposive sampling is suitable to select herds and/or animals for testing. For sentinel herds, animals selected to detect BTV transmission should be seronegative at the commencement of the period of study. For serological surveys, only animals that have a complete life history and have not been in an infected area should be sampled. This allows the interpretation of serological results with reference to location, which assists in clarifying the location of the boundary of the free zone.

A surveillance zone within a free country or zone should separate it from a potentially infected country or zone. Serological surveillance in a free country or zone should be carried out over a distance of at least 100 kilometres from the border with a potentially infected country or zone.

Serological monitoring in the infected zone should be weighted towards those areas near the boundary of the free country or zone, based on previous serological surveillance, and monitoring and other information. In view of the epidemiology of BTV, either random or purposive sampling is suitable to select herds to give an appropriate geographical spread and provide animals of suitable age and history for testing. Sentinel animals bled at regular intervals during the potential season of BTV activity provide the best method of detecting evidence of transmission because this approach provides information on the time that any transmission occurs. For sentinel herds, animals selected to detect transmission of BTV should be seronegative at the commencement of the period of study. For serological surveys, only animals that have a complete life history should be sampled. This allows the interpretation of serological results with reference to location, which assists in clarifying the location of the boundary of the free zone.

c) Virological surveillance and monitoring

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Isolation and genetic analysis of samples of BTV from a proportion of infected animals is beneficial in terms of providing information on serotype and genetic characteristics of the viruses concerned.

d) Vector surveillance and monitoring

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Vector surveillance and monitoring are desirable to obtain a sound understanding of the epidemiology of BTV in the area under study. Vector trapping should take account of the biology and behavioural characteristics of the vectors responsible for transmission in that environment. Vectors should be sorted to species and counted.

For transmission of BTV to occur, both BTV and sufficient competent vectors need to be present. Interpretation of results depends on vector competency, the number of vectors trapped, and the trapping method. Because *Culicoides* spp. can be transported long

distances by wind, it is possible for very low numbers of vectors to be detected occasionally in a BTV free country or zone. Such an occurrence may not necessarily change the status of the free country or zone, and the significance of such detections needs to be interpreted in light of serological surveillance and monitoring data and other factors that influence BTV distribution.

e) Climate knowledge

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Relevant climatic factors include rainfall, temperature, humidity, wind, and seasonal patterns. Although *Culicoides* spp. vectors are known to breed and survive only in warm, moist conditions, various species differ in their ability to survive and reproduce in different climates. The influence of climate should be considered in light of the ecology of the vector(s) operating in the area under study. Monitoring for evidence of climatic variations may also provide an early warning of potential spread of BTV from infected to free country or zones.

In addition, BTV transmission is seasonal in most areas and such knowledge allows the design of more effective surveillance and monitoring systems. For example, it is useful to allocate most effort to sentinel herd surveillance and monitoring during the BTV transmission season.

A clear understanding of the role of climate in the epidemiology of BTV is also required if a country or zone wishes to be considered as seasonally free.

f) Geography

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Geographical features such as deserts, mountain ranges, and large bodies of water can serve as barriers to BTV vectors. Factors related to geography also include vegetation and soil type.

The degree of variability of geographical features in the free country or zone and the adjoining country or zone should be considered. The level of variability influences the likelihood of the survival of isolated foci of vector populations in suitable ecological niches in a country or zone.

g) Livestock demographics and movements

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The surveillance programme needs to be tailored appropriately to the number, type and concentration of various ruminant species in a country or zone as these determine the availability of susceptible hosts.

The movement of potentially infected animals within a country or zone should be considered if there is an uneven distribution of vector populations that could support the transmission of BTV.

h) Historical considerations

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Relevant historical data (including climatic data and reports of outbreaks) over many years may be used to help design the surveillance programme.